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MODEL TP325

# TRIPLE OUTPUT LABORATORY POWER SUPPLY

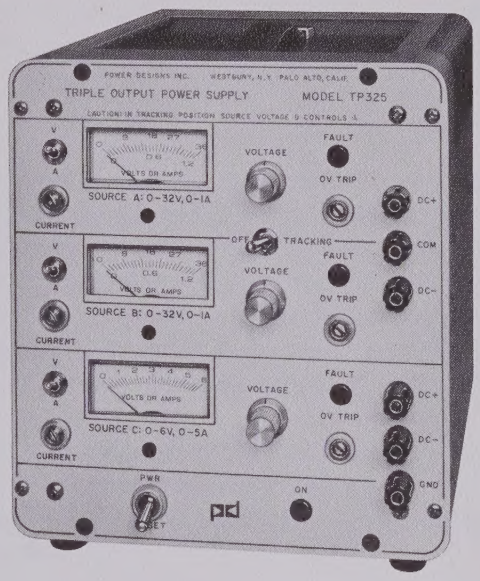
# DIGITAL AND ANALOG APPLICATIONS

**0-32 VDC, 0-1A***

**0-32 VDC, 0-1A***

**0-6 VDC, 0-5A**

**NOISE & RIPPLE LESS THAN 1.0 MILLIVOLT P-P**




* Independent or 0.1% tracking with panel switch

## features:

- No derating. All outputs may be operated simultaneously at full capacity for a maximum of 94 VA.
- Outputs are floating with respect to each other and chassis except for an internal connection between one negative terminal and one positive terminal of the 32 volt sources. The two 32 volt sources may be operated in series to provide 0-64 VDC, 0-1A in any polarity with respect to chassis or left floating. The 0-6 VDC source may be operated in any polarity with respect to chassis or left floating.
- Independent adjustment of each output voltage utilizing 10-turn potentiometers with .05% resolution.
- Separate current limiting adjustment for each output.
- Separately adjustable overvoltage crowbars on each output. Overvoltage crowbars on 0-32V outputs trip simultaneously at the lower voltage trip setting of either source.
- Three taut band suspension dual range meters individually selectable for voltage or current of each source.
- A "FAULT" indicator lamp on each output signals overload, short circuit, crowbar trip or current limit operation.
- Automatic voltage tracking of the 0-32 VDC sources to ±0.1% by means of a panel toggle switch. This switch is equipped with a locking lever to prevent accidental operation. Single potentiometer control of tracking outputs.
- Outputs may be shorted into each other in any polarity without damage.

## electrical specifications:

| PARAMETER: | 0-32V, 0-1A (each output) | 0-6V, 0-5A |
|---|---|---|
| INPUT: | 105-125V, 55-440 Hz, 200 w | |
| OUTPUT: | 0-32 VDC, 0-1A | 0-6V, 0-5A |
| LOAD REGULATION: | .01% +1 MV | .01% +5MV per amp |
| LINE REGULATION: | .01% +0.5 MV | .01% +0.5 MV |
| STABILITY: | *.02% +3 MV | *.02% +3 MV |
| RECOVERY TIME: | **50 μs | ** 100 μs |
| CURRENT LIMIT: | 10-105% of rated current | 0-105% of rated current |
| TEMPERATURE: | 0-50°C | 0-50°C |
| TEMP. COEFFICIENT: | .02% +300 μV/°C | .02% +300 μV/°C |
| OV CROWBAR: | adj. 5-40V | adj. 2.5-8V |
| TRACKING: | .1% +5 MV by front panel switch | |
| SOURCE IMPEDANCE: | less than 1.0 ohm to 1 MHz | less than 1.0 ohm to 1 MHz |
| VOLTAGE CONTROLS: | 10-turn potentiometers | single-turn potentiometer |
| FAULT INDICATORS: | lamp indicates short circuit and overload | lamp indicates short circuit and overload |
| METERING: | dual range volt/ammeter | dual range volt/ammeter |

*24 hours at constant, line, load and ambient temperature.
**To recover within 15 millivolts of nominal for a 10-100% load change.
*** Both crowbars trip together independent of setting

## mechanical specifications:

**DIMENSIONS:** 8¾" H x 7¾" W x 13½" D.
**WEIGHT:** 20 lbs.
**FINISH:** Natural anodized aluminum etched panels blue vinyl enamel cabinet, with carrying handle.

## price:

**$395.00**

**F.O.B. WESTBURY, N. Y.**
**Price subject to change without notice.**

**POWER DESIGNS**

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# APPENDIX

## 1. INTRODUCTION

This Appendix contains an Electrical Parts List, Schematic Diagram, Parts Location Diagram and Equipment Warranty.

## 2. ELECTRICAL PARTS LIST

All electrical and electronic parts are listed in the sequence of their circuit numbers as shown on the Schematic Diagram. A brief description of each part is given, followed by the code number of the manufacturer and his part number. All manufacturers' code numbers are taken from Cataloging Handbooks H4-1 and H4-2, Federal Supply Code for Manufacturers. These handbooks can be obtained from Federal Agencies or ordered directly from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

We recommend that all parts with the code number 98095 be ordered directly from Power Designs, Inc. The commercial equivalents of these parts may have wide parameter tolerances or require special factory inspection or modification before they can be used in the power supply.

All components used in the power supply or supplied as replacements are carefully inspected at the factory. Inspections are performed on a 100% basis or at AQL levels to Military Specification MIL-Q-9858 under which Power Designs, Inc. has been qualified.

All semiconductors are inspected on a 100% basis, not only for operating parameters, but also for critical characteristics related to reliability and predictable life expectancy. Some of these characteristics are observed when the device is taken beyond it's normal operating regions. These test techniques have been developed under a "predictable reliability" program in operation at Power Designs, Inc. for the past twelve years. Under this program, quality control procedures are constantly revaluated and updated as advances are made in solid state technology and experience is gained from field history.

Semiconductor manufacturers are continually modifying their products. Complete lines are discontinued to be replaced by devices having improved gain, operating voltage levels and frequency responses. The high gain, closed loop DC amplifiers used in regulator circuits are particularly sensitive to slight changes in these parameters. Commercial or military "equivalent" transistors may affect the performance of the power supply. We can assure compliance with the original specifications if replacement semiconductors are ordered from the Factory.

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We recommend that all parts with the code number 28005 be ordered directly from Power Designs, Inc. The commercial equivalents of these parts may have wide parameter tolerances or require special factory inspection or modification before they can be used in the power supply.

All components used in the power supply or supplied as replacements are carefully inspected at the factory. Inspection are performed on a 10% basis or at AQL levels in Military Specification MIL-C-9858 under which Power Designs, Inc. has been qualified.

All semiconductors are inspected on a 100% basis, not only for operating parameters but also for critical characteristics related to reliability and predictable life expectancy. Some of these characteristics are observed with the device is taken beyond its normal operating regions. These test techniques have been developed under a "predictable reliability" program. In operation at Power Designs, Inc. for the past twelve years. Under this program, quality control procedures are constantly evaluated and updated as advances are made in solid state technology and experience is gained from field history.

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All replacement semiconductors are processed and stocked at the factory to insure complete interchangeability with the devices in the original equipment. These devices are coded with a Power Designs, Inc. part number. For example:

| MS | 1028 | A |
|---|---|---|
| Semiconductor Manufacturer's Code | Power Designs, Inc. Type | Suffix Identifying Special Parameters |

When ordering replacements, please identify the device as thoroughly as possible, giving the model and serial number if available.

The replacement part you receive may not have the same part number as that shown on the Electrical Parts List. This can be due to several factors:

a) A different prefix indicates that Power Designs, Inc. is using another vendor source. The operating characteristics of the devices are identical.

b) A completely different part number indicates:

1. The original vendor has discontinued manufacture of the item or can no longer manufacture it to the original specifications.

2. A better device for use in a particular circuit has been substituted.

3. Tighter controls for interchangeability have provided greater assurance of reliability with the replacement.

## ELECTRICAL PARTS LIST

NOTE: Before replacing semiconductors, see paragraph 2 of this Appendix.

| Circuit Number | Description | Mfr Code Number | Part Number |
|---|---|---|---|
| C101 | Capacitor, plastic film, 0.1 μf, 200 vdc | 98095 | CP-17-2 |
| C102 | Capacitor, electrolytic, 100 μf, 50 vdc | 98095 | CE-95-.5 |
| C103 | Capacitor, electrolytic, 21,000 μf, 15 vdc | 98095 | CE-213-15 |
| C104 | Capacitor, plastic film, .0033 μf, 200 vdc | 98095 | CP-18-2 |
| C105, C106 | Capacitor, plastic film, .001 μf, 200 vdc | 98095 | CP-24-2 |
| C107, C108 | Capacitor, tantalum, 6.8 μf, 35 vdc | 98095 | CE-6A8-.35 |
| C109 | Capacitor, plastic film, .01 μf, 200 vdc | 98095 | CP-16-2 |
| C110 | Capacitor, electrolytic, 350 μf, 10 vdc | 98095 | CEX-350-10 |
| C111 | Capacitor, tantalum, 1 μf, 35 vdc | 98095 | CE-1-35 |
| C112 | Capacitor, ceramic disc, .02 μf, 500 vdc | 98095 | CC-23-5 |
| C201 | Capacitor, electrolytic, 260 μf, 15 vdc | 98095 | CEX-260-15 |
| C202 | Capacitor, plastic film, .01 μf, 200 vdc | 98095 | CP-16-2 |
| C203, C204 | Capacitor, electrolytic, 1800 μf, 55 vdc | 98095 | CE-182-55 |
| C205 | Capacitor, plastic film, 680 pf, 200 vdc | 98095 | CP-27-2 |
| C206 | Capacitor, ceramic disc, .02 μf, 100 vdc | 98095 | CC-21-1 |
| C207 | Capacitor, plastic film, .001 μf, 200 vdc | 98095 | CP-24-2 |
| C208 | Capacitor, plastic film, .022 μf, 200 vdc | 98095 | CP-A022-2 |
| C209 | Capacitor, plastic film, .01 μf, 200 vdc | 98095 | CP-16-2 |
| C211 | Capacitor, plastic film, .0047 μf, 200 vdc | 98095 | CP-26-2 |
| C212, C213 | Capacitor, tantalum, 1 μf, 50 vdc | 98095 | CE-1-500 |
| C214, C215 | Capacitor, tantalum, 6.8 μf, 35 vdc | 98095 | CE-6A8-.35 |
| C216 | Capacitor, plastic film, .01 μf, 200 vdc | 98095 | CP-16-2 |
| C217, C218 | Capacitor, electrolytic, 51 μf, 50 vdc | 98095 | CEX-51-50 |
| C219, C220 | Capacitor, plastic film, 0.1 μf, 200 vdc | 98095 | CP-17-2 |
| C221 | Capacitor, ceramic disc, .02 μf, 500 vdc | 98095 | CC-23-5 |
| C223 | Capacitor, plastic film, .001 μf, 200 vdc | 98095 | CP-24-2 |
| C224 | Capacitor, paper film, .047μf, 200 v dc | 98095 | CP-32-2 |
| CR101, CR102 | Diode, silicon | 98095 | GI44 |
| CR103, CR104 | Diode, silicon | 98095 | SY300 |
| CR105 thru CR108 | Diode, silicon | 98095 | GI44 |
| CR109 | Rectifier, silicon controlled | 98095 | MS9918-2 |
| CR110 | Diode, silicon | 98095 | SI5A2 |
| CR201 | Diode, silicon | 98095 | GI44 |
| CR202 | Bridge, rectifier | 83003 | VS248X/TT |
| CR206 thru CR214 | Diode, silicon | 98095 | GI44 |
| CR215 | Rectifier, silicon controlled | 98095 | TIC47 |
| CR216 | Rectifier, silicon controlled | 98095 | 2N4442 |
| CR217, CR218 | Diode, silicon | 98095 | SI5A2 |
| DS101 | Pilot light assembly (red) | 98095 | PLA-21 |
| DS201 | Pilot light assembly (red) | 98095 | PLA-24 |
| DS202, DS203 | Pilot light assembly (red) | 98095 | PLA-21 |

| Circuit Number | Description | Mfr Code Number | Part Number |
|---|---|---|---|
| F1 | Fuse, 3 A, Slo-Blo | 71400 | MDX |
| F101 | Fuse, 8 A, 32 V, Slo-Blo | 71400 | MDL |
| F201, F202 | Fuse, 2 A, 250 V, Slo-Blo | 71400 | MDX |
| M101 | Meter, 0-6 V, 0-6 A | 98095 | MVA-151 |
| M201, M202 | Meter, 0-32 V, 0-1 A | 98095 | MVA-166 |
| Q101 | Transistor, silicon, NPN | 98095 | TI2270 |
| Q102 | Transistor, silicon, PNP | 98095 | TI1028A |
| Q103 | Transistor, silicon, NPN | 98095 | TI2270 |
| Q104 thru Q106 | Transistor, silicon, NPN | 98095 | TRW 1700C (Violet or Blue Dot) |
| Q107 | Transistor, silicon, PNP | 98095 | TI1028A |
| Q108 thru Q110 | Transistor, silicon, NPN | 98095 | TI2270 |
| Q111 | Transistor, silicon, PNP | 98095 | TI1028A |
| Q201 | Transistor, silicon, NPN | 98095 | 2N2243A |
| Q202 | Transistor, silicon, PNP | 98095 | MS1075 |
| Q203 | Transistor, silicon, NPN | 98095 | TI2270 |
| Q204, Q205 | Transistor, silicon, NPN | 98095 | TRW/STC1700C (Red Dot) |
| Q206 | Transistor, silicon, NPN | 98095 | RA2270/U |
| Q207, Q208 | Transistor, silicon, NPN | 98095 | 2N2243A |
| Q209, Q210 | Transistor, silicon, NPN | 98095 | TRW/STC1700C (Red Dot) |
| Q211, Q212 | Transistor, silicon, PNP | 98095 | MS1075 |
| Q213 | Transistor, silicon, NPN | 98095 | 2N2243A |
| Q214 | Transistor, silicon, PNP | 98095 | TI1028A |
| Q215, Q216 | Transistor, silicon, NPN | 98095 | TI2270 |
| Q217 | Transistor, silicon, NPN | 98095 | 2N2243A |
| Q218, Q219 | Transistor, silicon, PNP | 98095 | MS1075 |
| Q220 | Transistor, silicon, NPN | 98095 | 2N2243A |
| Q221, Q222 | Transistor, silicon, PNP | 98095 | TI1028A |
| R101 | Resistor, composition, 2.7 kΩ, ± 10%, 1 w | 01121 | GB2721 |
| R102 | Resistor, wirewound, 600 Ω, ± 5%, 3 w | 98095 | RW-601-3KA |
| R103 | Resistor, composition, 2.2 kΩ, ± 10%, 1/2 w | 01121 | EB2221 |
| R104 | Resistor, wirewound, 700 Ω, ± 5%, 3 w | 98095 | RW-701-3KA |
| R105 | Resistor, composition, 1 kΩ, ± 10%, 1/2 w | 01121 | EB1021 |
| R106 | Resistor, composition, 39 kΩ, ± 10%, 1/2 w | 01121 | EB3931 |
| R107 | Resistor, composition, 3.3 kΩ, ± 10%, 1/2 w | 01121 | EB3321 |
| R108 | Resistor, composition, 4.7 kΩ, ± 10%, 1/2 w | 01121 | EB4721 |
| R109 | Resistor, composition, 100 Ω, ± 10%, 1/2 w | 01121 | EB1011 |
| R110, R111 | Resistor, precision, metal film, 1.21 kΩ, ± 1%, 1/4 w | 98095 | RD-1211-1QA |
| R112 | Resistor, wirewound, 0.2 Ω, ± 5%, 7 w | 98095 | RW-F2-3RA |
| R113 | Resistor, precision, metal film, 1 kΩ, ± 1%, 1/4 w | 98095 | RD-102-1QA |
| R114 | Resistor, wirewound, 0.2 Ω, ± 5%, 7 w | 98095 | RW-F2-3RA |

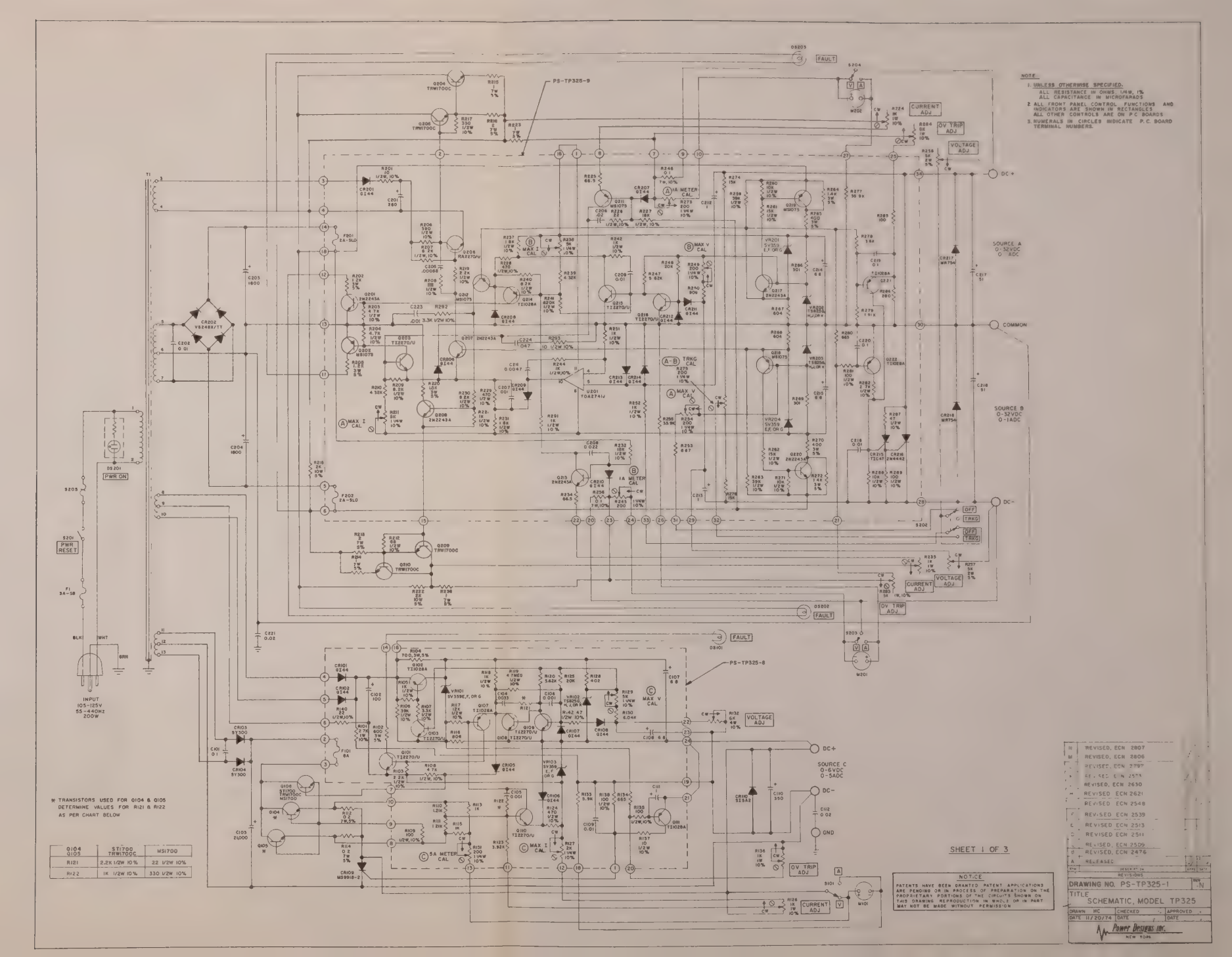
| Circuit Number | Description | Mfr Code Number | Part Number |
|---|---|---|---|
| R115 | Resistor, precision, metal film, 1 kΩ, ± 1%, 1/4 w | 98095 | RD-102-1QA |
| R116 | Resistor, precision, metal film, 806 Ω, ± 1%, 1/4 w | 98095 | RD-8060-1QA |
| R117 | Resistor, composition, 12 kΩ, ± 10%, 1/2 w | 01121 | EB1231 |
| R118 | Resistor, composition, 1 kΩ, ± 10%, 1/2 w | 01121 | EB1021 |
| R119 | Resistor, composition, 4.7 megΩ, ± 10%, 1/2 w | 01121 | EB4751 |
| R120 | Resistor, precision, metal film, 5.62 kΩ, ± 1%, 1/4 w | 98095 | RD-5621-1QA |
| R121 | Resistor, composition, 2.2 kΩ, ± 10%, 1/2 w | 01121 | EB2221 |
| R122 | Resistor, composition, 1 kΩ, ± 10%, 1/2 w | 01121 | EB1021 |
| R123 | Resistor, precision, metal film, 3.92 kΩ, ± 1%, 1/4 w | 98095 | RD-3921-1QA |
| R124 | Resistor, composition, 470 Ω, ± 10%, 1/2 w | 01121 | EB4711 |
| R125 | Resistor, precision, metal film, 20 kΩ, ± 1%, 1/4 w | 98095 | RD-203-1QA |
| R126 | Resistor, potentiometer, 1 kΩ, ± 10%, 2 w | 98095 | RVC-102B4-1.125 |
| R127 | Resistor, potentiometer, 2 kΩ, ± 10%, 1-1/4 w | 98095 | RWTP-202-C4 |
| R128 | Resistor, precision, metal film, 402 Ω, ± 1%, 1/4 w | 98095 | RD-4020-1QA |
| R129 | Resistor, potentiometer, 5 kΩ, ± 10%, 1-1/4 w | 98095 | RWTP-502-C4 |
| R130 | Resistor, precision, metal film, 6.04 kΩ, ± 1%, 1/4 w | 98095 | RD-6041-1QA |
| R131 | Resistor, potentiometer, 200 Ω, ± 10%, 1-1/4 w | 98095 | RWTP-201-C4 |
| R132 | Resistor, potentiometer, 6 kΩ, ± 10%, 4 w | 98095 | RWV602M4-.87 |
| R133 | Resistor, precision, metal film, 5.9 kΩ, ± 1%, 1/4 w | 98095 | RD-592-1QA |
| R134 | Resistor, precision, metal film, 665 Ω, ± 1%, 1/4 w | 98095 | RD-6650-1QA |
| R135 | Resistor, composition, 100 Ω, ± 10%, 1/2 w | 01121 | EB1011 |
| R136 | Resistor, potentiometer, 1 kΩ, ± 10%, 2 w | 98095 | RVC-102B4-1.125 |
| R137 | Resistor, composition, 10 Ω, ± 10%, 1/2 w | 01121 | EB1001 |
| R138 | Resistor, composition, 100 Ω, ± 10%, 1/2 w | 01121 | EB1011 |
| R140 | Resistor, composition, 22 Ω, ± 10%, 1/2 w | 01121 | EB2201 |
| R142 | Resistor, composition, 47 Ω, ± 10%, 1/2 w | 01121 | EB4701 |
| R201 | Resistor, composition, 10 Ω, ± 10%, 1/2 w | 01121 | EB1001 |
| R202 | Resistor, wirewound, 1.2 kΩ, ± 5%, 3 w | 98095 | RW-122-3KA |
| R203, R204 | Resistor, composition, 4.7 kΩ, ± 10%, 1/2 w | 01121 | EB4721 |
| R205 | Resistor, wirewound, 1.2 kΩ, ± 5%, 3 w | 98095 | RW-122-3KA |
| R206 | Resistor, composition, 390 Ω, ± 10%, 1/2 w | 01121 | EB3911 |
| R207 | Resistor, composition, 8.2 kΩ, ± 10%, 1/2 w | 01121 | EB8221 |
| R208 | Resistor, composition, 68 Ω, ± 10%, 1/2 w | 01121 | EB6801 |
| R209 | Resistor, composition, 8.2 kΩ, ± 10%, 1/2 w | 01121 | EB8221 |
| R210 | Resistor, precision, metal film, 4.32 kΩ, ± 1%, 1/4 w | 98095 | RD-4321-1QA |
| R211 | Resistor, potentiometer, 5 kΩ, ± 10%, 1-1/4 w | 98095 | RWTP-502-C4 |
| R212 | Resistor, composition, 68 Ω, ± 10%, 1/2 w | 01121 | EB6801 |
| R213 | Resistor, wirewound, 2 Ω, ± 5%, 7 w | 98095 | RW-020-3RA |
| R214, R215 | Resistor, wirewound, 1 Ω, ± 5%, 7 w | 98095 | RW-010-3RA |
| R216 | Resistor, wirewound, 2 Ω, ± 5%, 7 w | 98095 | RW-020-3RA |
| R217 | Resistor, composition, 330 Ω, ± 10%, 1/2 w | 01121 | EB3311 |
| R218 | Resistor, wirewound, 2 kΩ, ± 5%, 10 w | 98095 | RW-202-3EA |
| R219 | Resistor, composition, 2.2 kΩ, ± 10%, 1/2 w | 01121 | EB2221 |
| R220 | Resistor, wirewound, 1.5 kΩ, ± 5%, 3 w | 98095 | RW-152-3KA |
| R221 | Resistor, composition, 1 kΩ, ± 10%, 1/2 w | 01121 | EB1021 |
| R222 | Resistor, wirewound, 2 kΩ, ± 5%, 10 w | 98095 | RW-202-3EA |
| R223 | Resistor, wirewound, 1 Ω, ± 5%, 7 w | 98095 | RW-010-3RA |
| R224 | Resistor, potentiometer, 1 kΩ, ± 10%, 2 w | 98095 | RVC-102B4-1.125 |

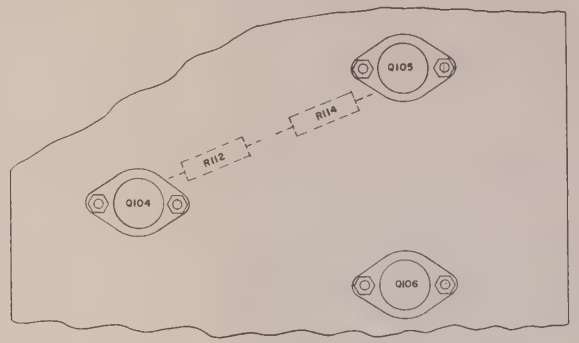
| Circuit Number | Description | Mfr Code Number | Part Number |
|---|---|---|---|
| R225 | Resistor, precision, metal film, 66.5 Ω, ± 1%, 1/4 w | 98095 | RD-66F5-1QA |
| R226 | Resistor, composition, 22 Ω, ± 10%, 1/2 w | 01121 | EB2201 |
| R227 | Resistor, composition, 18 kΩ, ± 10%, 1/2 w | 01121 | EB1831 |
| R228, R229 | Resistor, composition, 470 Ω, ± 10%, 1/2 w | 01121 | EB4711 |
| R230 | Resistor, composition, 8.2 kΩ, ± 10%, 1/2 w | 01121 | EB8221 |
| R231 | Resistor, composition, 1.8 kΩ, ± 10%, 1/2 w | 01121 | EB1821 |
| R232 | Resistor, composition, 18 kΩ, ± 10%, 1/2 w | 01121 | EB1831 |
| R234 | Resistor, precision, metal film, 66.5 Ω, ± 1%, 1/4 w | 98095 | RD-66F5-1QA |
| R235 | Resistor, potentiometer, 1 kΩ, ± 10%, 2 w | 98095 | RVC-102B4-1.125 |
| R236 | Resistor, wirewound, 1 Ω, ± 5%, 7 w | 98095 | RW-010-3RA |
| R237 | Resistor, composition, 1.8 kΩ, ± 10%, 1/2 w | 01121 | EB1821 |
| R238 | Resistor, potentiometer, 5 kΩ, ± 10%, 1-1/4 w | 98095 | RWTP-502-C4 |
| R239 | Resistor, precision, metal film, 4.32 kΩ, ± 1%, 1/4 w | 98095 | RD-4321-1QA |
| R240 | Resistor, composition, 8.2 kΩ, ± 10%, 1/2 w | 01121 | EB8221 |
| R241 | Resistor, composition, 820 kΩ, ± 10%, 1/2 w | 01121 | EB8241 |
| R242 | Resistor, composition, 1 kΩ, ± 10%, 1/2 w | 01121 | EB1021 |
| R244 | Resistor, composition, 1 kΩ, ± 10%, 1/2 w | 01121 | EB1021 |
| R245 | Resistor, potentiometer, 200 Ω, ± 10%, 1-1/4 w | 98095 | RWTP-201-C4 |
| R246 | Resistor, wirewound, 0.12 Ω, ± 10%, 7 w | 98095 | RW-F12-4RA |
| R247 | Resistor, precision, metal film, 5.62 kΩ, ± 1%, 1/4 w | 98095 | RD-5621-1QA |
| R248 | Resistor, precision, metal film, 20 kΩ, ± 1%, 1/4 w | 98095 | RD-203-1QA |
| R249 | Resistor, potentiometer, 200 Ω, ± 10%, 1-1/4 w | 98095 | RWTP-201-C4 |
| R250 | Resistor, precision, metal film, 909 Ω, ± 1%, 1/4 w | 98095 | RD-9090-1QA |
| R251, R252 | Resistor, composition, 1 kΩ, ± 10%, 1/2 w | 01121 | EB1021 |
| R253 | Resistor, precision, metal film, 887 Ω, ± 1%, 1/4 w | 98095 | RD-8870-1QA |
| R254 | Resistor, potentiometer, 200 Ω, ± 10%, 1-1/4 w | 98095 | RWTP-201-C4 |
| R255 | Resistor, precision, metal film, 32 kΩ, ± 1%, 1/4 w | 98095 | RD-323-1QA |
| R256 | Resistor, wirewound, 0.12 Ω, ± 10%, 7 w | 98095 | RW-F12-4RA |
| R257, R258 | Resistor, potentiometer, var., 5 kΩ, ± 5%, 2 w, 10 turn | 98095 | RWV-502-3C10 |
| R259 | Resistor, composition, 39 kΩ, ± 10%, 1/2 w | 01121 | EB3931 |
| R260 | Resistor, composition, 10 kΩ, ± 10%, 1/2 w | 01121 | EB1031 |
| R261, R262 | Resistor, composition, 15 kΩ, ± 10%, 1/2 w | 01121 | EB1531 |
| R263 | Resistor, composition, 39 kΩ, ± 10%, 1/2 w | 01121 | EB3931 |
| R264 | Resistor, wirewound, 1.4 kΩ, ± 5%, 3 w | 98095 | RW-142-3KA |
| R265 | Resistor, wirewound, 400 Ω, ± 5%, 3 w | 98095 | RW-401-3KA |
| R266 | Resistor, precision, metal film, 301 Ω, ± 1%, 1/4 w | 98095 | RD-3010-1QA |
| R267, R268 | Resistor, precision, metal film, 604 Ω, ± 1%, 1/4 w | 98095 | RD-6040-1QA |
| R269 | Resistor, precision, metal film, 301 Ω, ± 1%, 1/4 w | 98095 | RD-3010-1QA |
| R270 | Resistor, wirewound, 400 Ω, ± 5%, 3 w | 98095 | RW-401-3KA |
| R271 | Resistor, composition, 10 kΩ, ± 10%, 1/2 w | 01121 | EB1031 |
| R272 | Resistor, wirewound, 1.4 kΩ, ± 5%, 3 w | 98095 | RW-142-3KA |
| R273 | Resistor, potentiometer, 200 Ω, ± 10%, 1-1/4 w | 98095 | RWTP-201-C |
| R274 | Resistor, precision, metal film, 15 kΩ, ± 1%, 1/4 w | 98095 | RD-153-1QA |
| R275 | Resistor, potentiometer, 200 Ω, ± 10%, 1-1/4 w | 98095 | RWTP-201-C |
| R276 | Resistor, precision, metal film, 15 kΩ, ± 1%, 1/4 w | 98095 | RD-153-1QA |
| R277 | Resistor, precision, metal film, 32 kΩ, ± 1%, 1/4 w | 98095 | RD-323-1QA |
| R278 | Resistor, precision, metal film, 3.6 kΩ, ± 1%, 1/4 w | 98095 | RD-362-1QA |
| R279 | Resistor, precision, metal film, 1.91 kΩ, ± 1%, 1/4 w | 98095 | RD-1911-1QA |
| R280 | Resistor, precision, metal film, 665 Ω, ± 1%, 1/4 w | 98095 | RD-6650-1QA |

| Circuit Number | Description | Mfr Code Number | Part Number |
|---|---|---|---|
| R281 | Resistor, composition, 100 Ω, ± 10%, 1/2 w | 01121 | EB1011 |
| R282 | Resistor, composition, 2.7 kΩ, ± 10%, 1/2 w | 01121 | EB2721 |
| R283, R284 | Resistor, potentiometer, 5 kΩ, ± 10%, 2 w | 98095 | RVC-502B4-1.7 |
| R285 | Resistor, precision, metal film, 100 Ω, ± 1%, 1/4 w | 98095 | RD-1010-1QA |
| R286 | Resistor, precision, metal film, 280 Ω, ± 1%, 1/4 w | 98095 | RD-281-1QA |
| R287 | Resistor, composition, 47 Ω, ± 10%, 1/2 w | 01121 | EB4701 |
| R288 | Resistor, composition, 10 kΩ, ± 10%, 1/2 w | 01121 | EB1031 |
| R289 | Resistor, composition, 100 Ω, ± 10%, 1/2 w | 01121 | EB1011 |
| R291 | Resistor, composition, 1 kΩ, ± 10%, 1/2 w | 01121 | EB1021 |
| R292 | Resistor, composition, 3.3 kΩ, ± 10%, 1/2 w | 01121 | EB3321 |
| R293 | Resistor, composition, 10 Ω, ± 10%, 1/2 w | 01121 | EB1001 |
| S101 | Switch, toggle, DPDT | 98095 | ST-39 |
| S201 | Switch, ON-OFF, SPST | 98095 | ST-5 |
| S202 | Switch, toggle, DPDT | 98095 | ST-36 |
| S203, S204 | Switch, toggle, DPDT | 98095 | ST-39 |
| S205 | Thermostat | 98095 | STH-2 |
| T1 | Transformer for Model TP325 (105/125 VAC, 57 - 440 Hz) | 98095 | TTM-TP325 |
| | or | | |
| | Transformer for Model TP325J (105/125 VAC, 47 - 440 Hz) | 98095 | TTM-TP325K |
| | or | | |
| | Transformer for Model TP325K (210/250 VAC, 47 - 440 Hz) | 98095 | TTM-TP325K |
| U201 | Integrated circuit | 98095 | TOA2741 |
| VR101 | Diode, silicon, zener | 98095 | DZ E, F, G |
| VR102 | Diode, silicon, zener | 98095 | TS825G, H, J |
| VR103 | Diode, silicon, zener | 98095 | DZ E, F, G |
| VR201 | Diode, silicon, zener | 98095 | DZ E, F, G |
| VR202, 203 | Diode, silicon, zener | 98095 | TS825G, H, J |
| VR204 | Diode, silicon, zener | 98095 | DZ E, F, G |

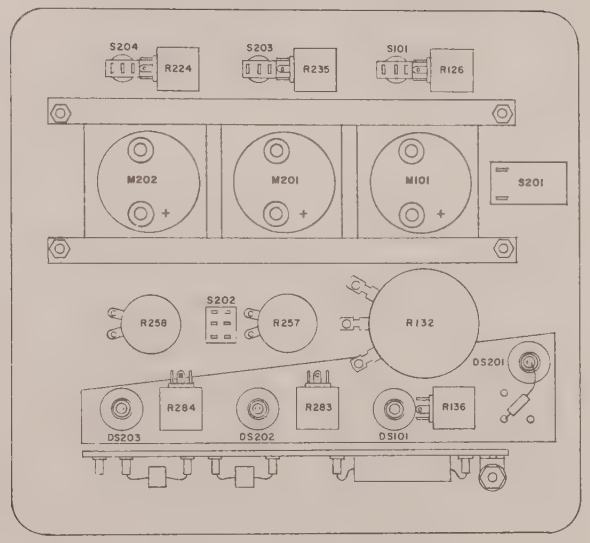
CODE LIST OF MANUFACTURERS

| | | |
|---|---|---|
| 01121 | Allen-Bradley Company | Milwaukee, Wisconsin |
| 71400 | Bussman Manufacturing Division | St. Louis, Missouri |
| 83003 | Varo, Inc. | Garland, Texas |
| 98095 | Power Designs Inc. | Westbury, New York |

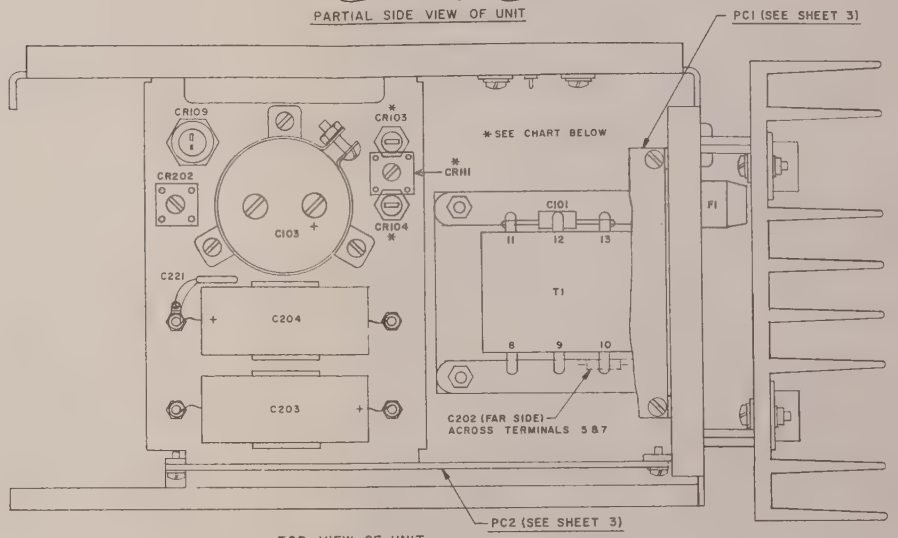

NOTE
1. UNLESS OTHERWISE SPECIFIED:
ALL RESISTANCE IN OHMS, 1/4W, 1%
ALL CAPACITANCE IN MICROFARADS
2. ALL FRONT PANEL CONTROL FUNCTIONS AND INDICATORS ARE SHOWN IN RECTANGLES. ALL OTHER CONTROLS ARE ON P.C. BOARDS
3. NUMERALS IN CIRCLES INDICATE P.C. BOARD TERMINAL NUMBERS.
PS-TP325-9
PS-TP325-8
FAULT
CURRENT ADJ
OV TRIP ADJ
VOLTAGE ADJ
DC+
DC-
COMMON
SOURCE A 0-32VDC 0-10ADC
SOURCE B 0-32VDC 0-10ADC
SOURCE C 0-6VDC 0-5ADC
PWR ON
PWR RESET
INPUT 105-125V 55-440HZ 200W
MAX I CAL
MAX V CAL
1A METER CAL
5A METER CAL
A-B TRKG CAL
OFF TRKG
* TRANSISTORS USED FOR Q104 & Q105 DETERMINE VALUES FOR R121 & R122 AS PER CHART BELOW
Q104 Q105 | ST1700 TRW1700C | MSI700
R121 | 2.2K 1/2W 10% | 22 1/2W 10%
R122 | 1K 1/2W 10% | 330 1/2W 10%
SHEET 1 OF 3
NOTICE
PATENTS HAVE BEEN GRANTED PATENT APPLICATIONS ARE PENDING OR IN PROCESS OF PREPARATION ON THE PROPRIETARY PORTIONS OF THE CIRCUITS SHOWN ON THIS DRAWING. REPRODUCTION IN WHOLE OR IN PART MAY NOT BE MADE WITHOUT PERMISSION
N REVISED, ECN 2807
M REVISED, ECN 2806
L REVISED, ECN 2797
K REVISED, ECN 2573
J REVISED, ECN 2630
H REVISED ECN 2621
G REVISED ECN 2548
F REVISED ECN 2539
E REVISED ECN 2513
D REVISED ECN 2511
C REVISED ECN 2509
B REVISED, ECN 2476
A RELEASED
DESCRIPTION REVISIONS
DRAWING NO. PS-TP325-1 REV N
TITLE SCHEMATIC, MODEL TP325
DRAWN MC CHECKED APPROVED
DATE 11/20/74 DATE DATE
POWER DESIGNERS INC. NEW YORK



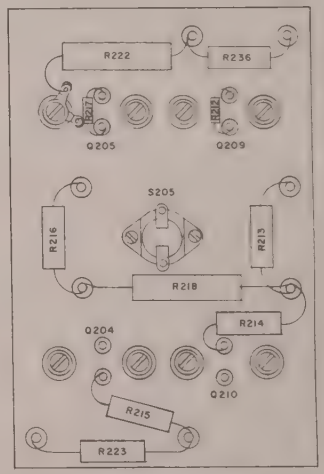

PARTIAL SIDE VIEW OF UNIT



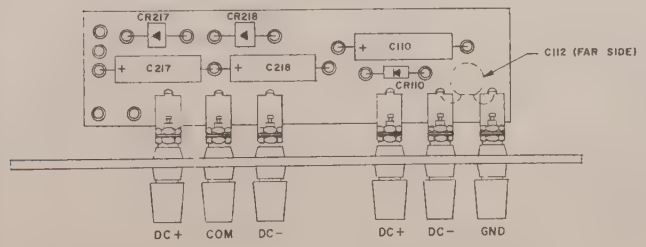

PANEL–REAR VIEW




TOP VIEW OF UNIT




HEATSINK–REAR VIEW




| | MODEL TP-325 | MODEL TP-330 |
|---|---|---|
| CR103 | USED | NOT USED |
| CR104 | USED | NOT USED |
| CR111 | NOT USED | USED |

| SYM | DESCRIPTION | APPD | DATE |
|---|---|---|---|
| | REVISIONS | | |
| N | REVISED, ECN 2807 | | 12/30/77 |
| M | REVISED, ECN 2806 | | 12/14/77 |
| L | REVISED, ECN 2797 | | 11/9/77 |
| K | REVISED, ECN 2573 | | 4/5/76 |
| J | REVISED ECN 2630 | | 10/27/76 |
| H | REVISED ECN 2621 | | 9/14/76 |
| G | REVISED ECN 2548 | | 4/26/76 |
| F | REVISED ECN 2539 | | 3/29/76 |
| E | REVISED ECN 2513 | | 2/27/76 |
| D | REVISED ECN 2511 | | 2/4/76 |
| C | REVISED ECN 2509 | | 1/21/76 |
| B | REVISED, ECN 2476 | | 12/15/75 |
| A | RELEASED | | 12/2/75 |

DRAWING NO. PS-TP325-1/ PS-TP-330- REV. N

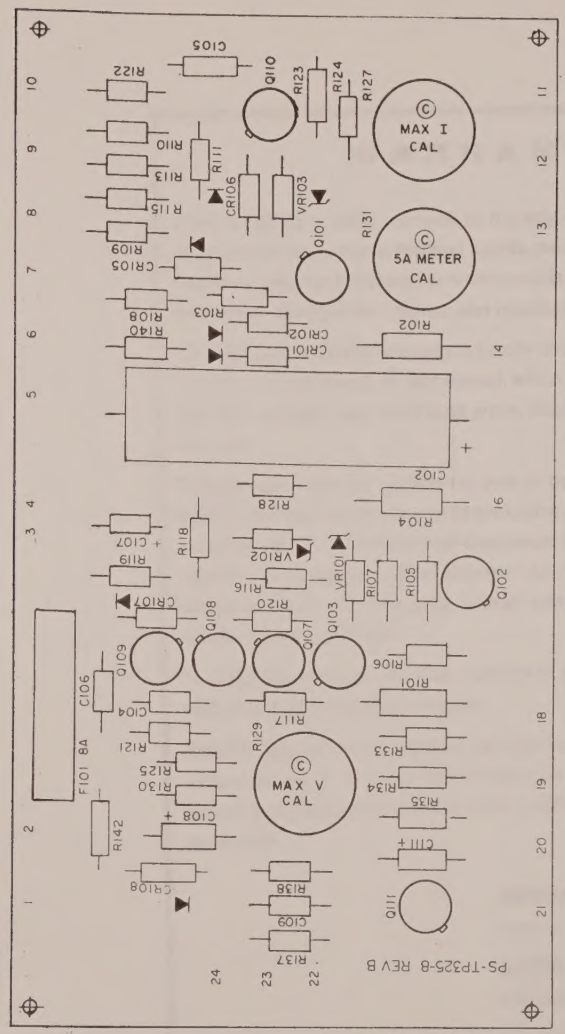
TITLE LOCATION OF COMPONENTS MODEL TP-325/TP-330

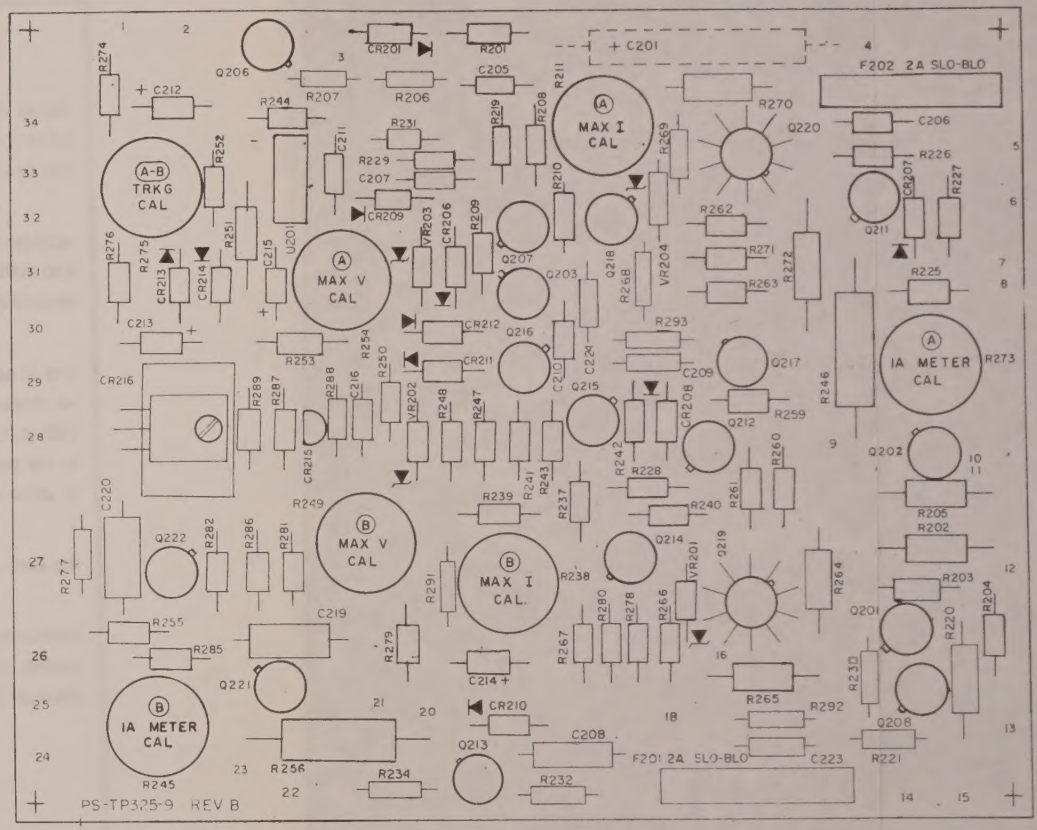
DRAWN HC | CHECKED | APPROVED

DATE 12/4/74 | DATE | DATE

Power Designs inc. NEW YORK

SHEET 2 OF 3




SHEET 3 OF 3

| SYM. | DESCRIPTION | APPD. | DATE |
|---|---|---|---|
| N | REVISED, ECN 2807 | | 3/24/77 |
| M | REVISED, ECN 2806 | | 3/24/77 |
| L | REVISED, ECN 2797 | | 4/7/77 |
| K | REVISED, ECN 2573 | | 8/1/76 |
| J | REVISED ECN 2630 | | 3/17/76 |
| H | REVISED ECN 2621 | | 3/17/76 |
| G | REVISED ECN 2548 | | 12/4/75 |
| F | REVISED ECN 2539 | | 11/4/75 |
| E | REDRAWN ECN 2513 | | |

REVISIONS

DRAWING NO. PS-TP325-1/PS-TP330-1 REV. N

TITLE MODEL TP-325/TP-330
LOCATION OF COMPONENTS

| DRAWN | CHECKED | APPROVED |
|---|---|---|
| DATE 7-5-75 | DATE 6/15/75 | DATE 11/6/75 |

Power Designs inc.
NEW YORK

# WARRANTY

POWER DESIGNS INC., warrants to the original purchaser, each instrument sold by us, or our authorized agents, and all the parts thereof, to be free from defects in material or workmanship under normal use and service within the specified ratings and operating conditions.

Its obligation under this warranty is hereby limited to the repair or replacement of any instrument, or part thereof, which is returned to us within one year after delivery, and which shall prove, after our examination, to be thus defective.

This warranty does not include the cost of transportation charges to and from the factory and/or the cost of packaging or crating of instruments for return to the factory, unless such instrument is returned within thirty (30) days from the date of original shipment as shown on the packing list or shipping documents, and prior written authorization for such costs is obtained from the factory.

The repair or replacement of an instrument, or any part thereof, does not void or extend the original warranty.

POWER DESIGNS INC., reserves the right to discontinue any instrument without notice, or to make modifications in design at any time, without incurring any obligation to make these modifications in instruments previously sold.

**POWER DESIGNS INC.**
Westbury, L. I., New York

**POWER DESIGNS PACIFIC, INC.**
Palo Alto, California

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POWER DESIGNS INC.
Westbury, L.I., New York

POWER DESIGNS PACIFIC, INC.
Palo Alto, California